



H A R V A R D | B U S I N E S S | S C H O O L

# Applying Time-Driven ABC in Health Care

Value-Based Health Care Intensive Seminar  
January 2019

Bob Kaplan

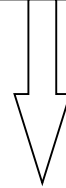
Senior Fellow and Marvin Bower Professor of Leadership  
Development, Emeritus

# TDABC promotes collaboration between clinicians and finance personnel

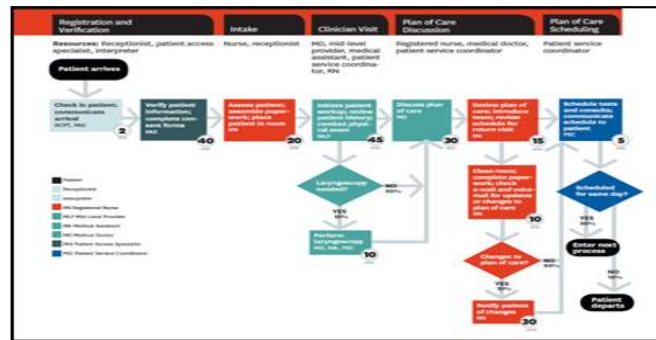
$$\text{Cost} = \text{Quantity (Q)} \times \text{Price (P)}$$



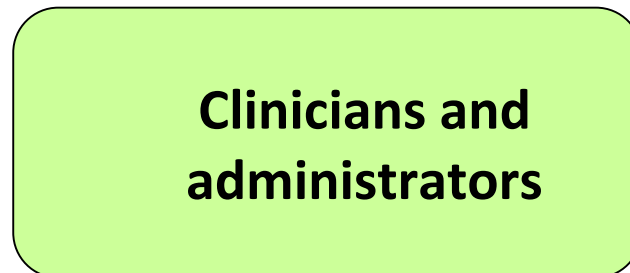
"P"



**Cost of Supplying Resources  
(People, Equipment, Space,  
Consumables)**



"Q"

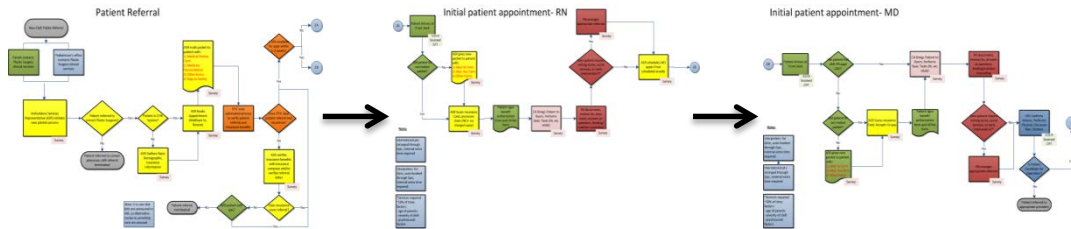


**How we deliver care  
today for patients**



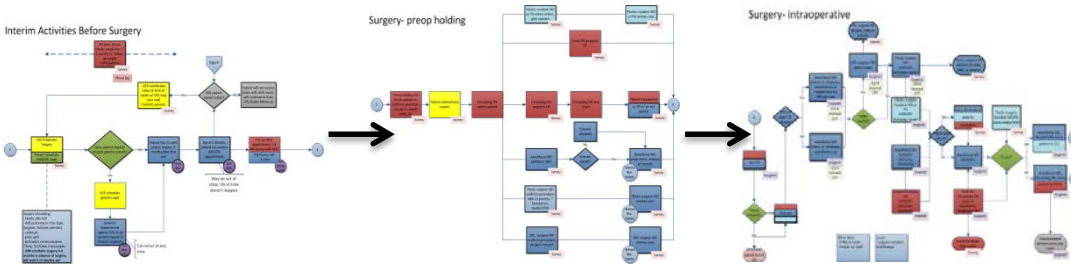
# Measuring Patient's Cost over a Complete Cycle of Care for a Medical Condition

## Initial consultation



	Minutes	Cost/ minute	*Total
MD	$X_1$	$Y_1$	136.13
RN	$X_2$	$Y_2$	68.04
CA	$X_3$	$Y_3$	6.17
ASR	$X_4$	$Y_4$	15.74
			<b>\$266.08</b>

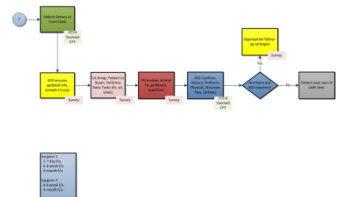
## Surgical procedure



MD	$X_1$	$Y_1$	584.99
Anes.	$X_2$	$Y_2$	603.89
RN	$X_3$	$Y_3$	136.29
Tech	$X_4$	$Y_4$	97.82
OR	$X_5$	$Y_5$	329.16
			<b>\$1752.15</b>

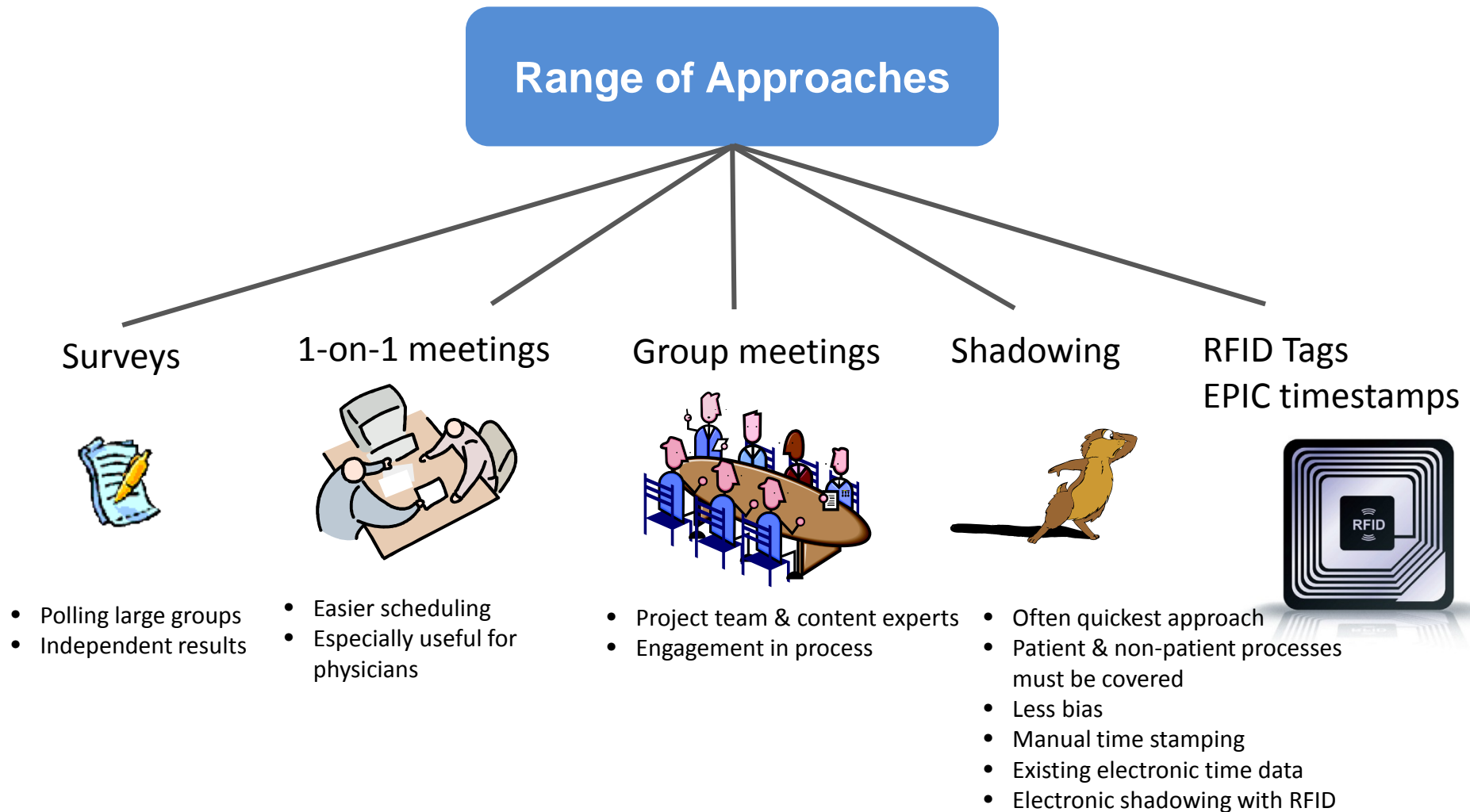
## Follow-up or post-operative visit

Plastics surgery follow-up appointments (post-op or other)



MD	$X_1$	$Y_1$	55.19
RN	$X_2$	$Y_2$	13.61
CA	$X_3$	$Y_3$	3.09
ASR	$X_4$	$Y_4$	1.77
			<b>\$73.66</b>

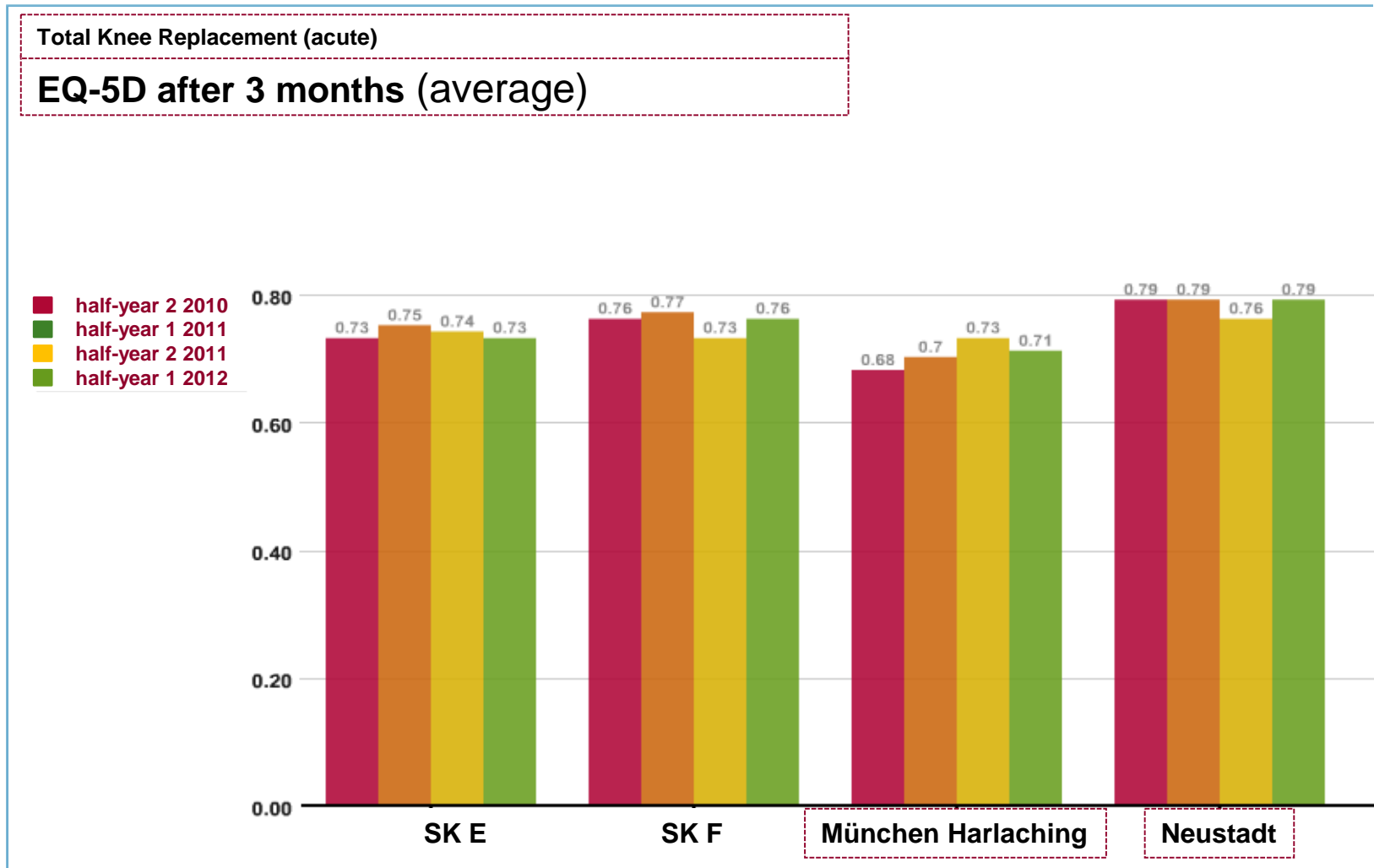
# Developing a Process Map



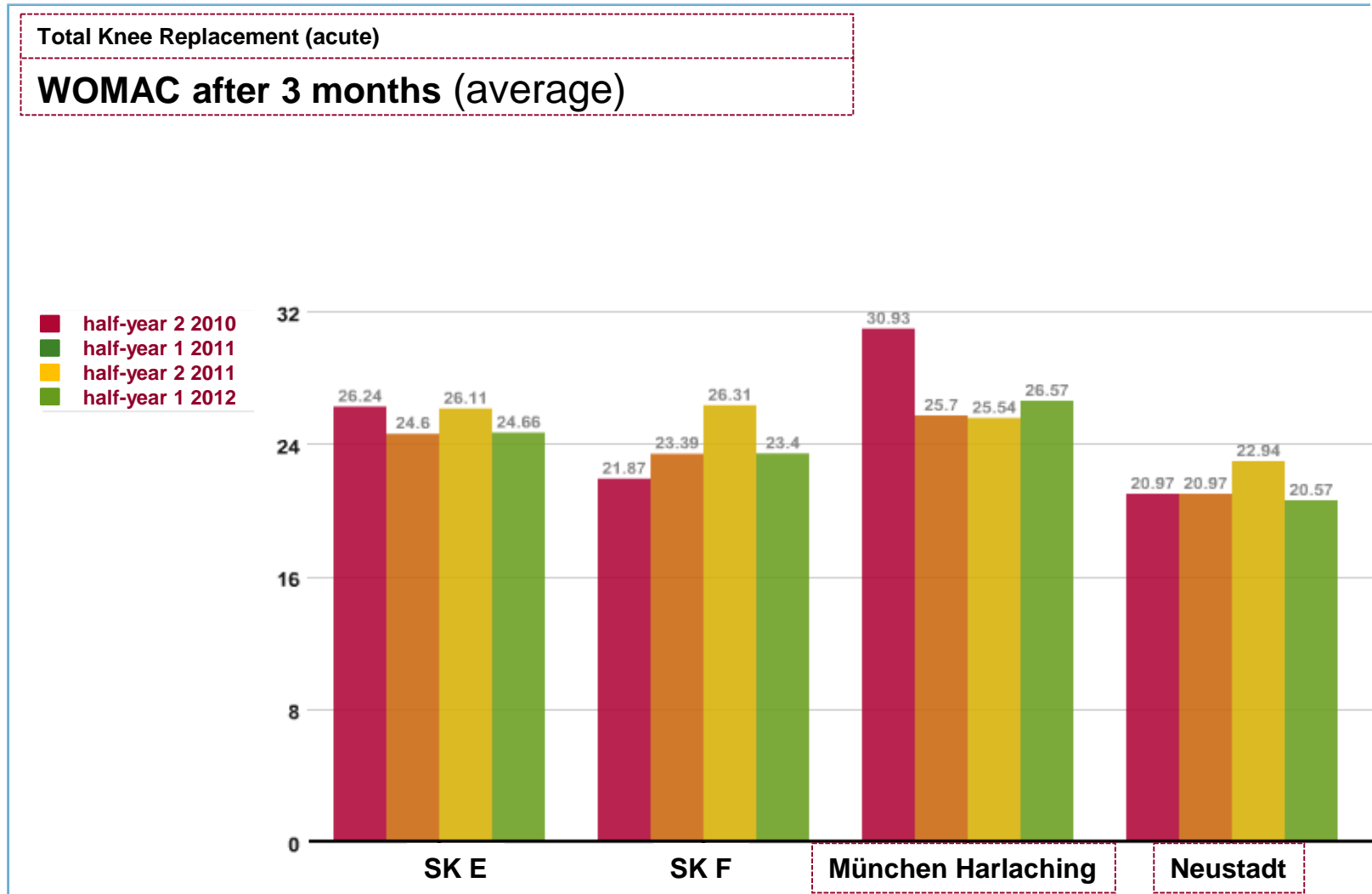
# Communicating about TDABC to clinicians

- The goal of the project is to better understand all of the personnel time and resources that we use today to care for a patient with a particular medical condition
- You will not be evaluated at all based on the answers that you provide (may need to say this 7 times 7 different ways)
- We are simply looking for your estimates and best guesses—it is ok if you do not know a number exactly
- While we are primarily trying to gain a better understanding of all of the work and resources that are currently involved in the care cycle, we would love to hear your ideas and suggestions for how we could be providing care more efficiently and effectively

# Outcome measurement EQ-5D (quality of life): Neustadt with significant higher level than the other Schön hospitals



# Outcome measurement WOMAC (functionality): Neustadt again with significant better results

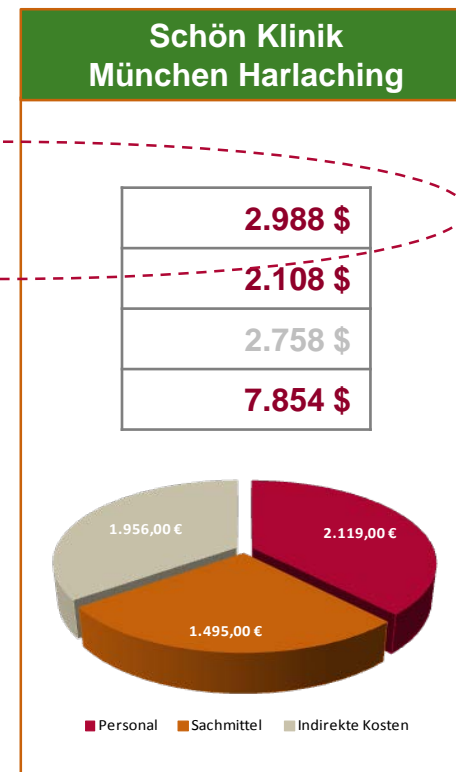
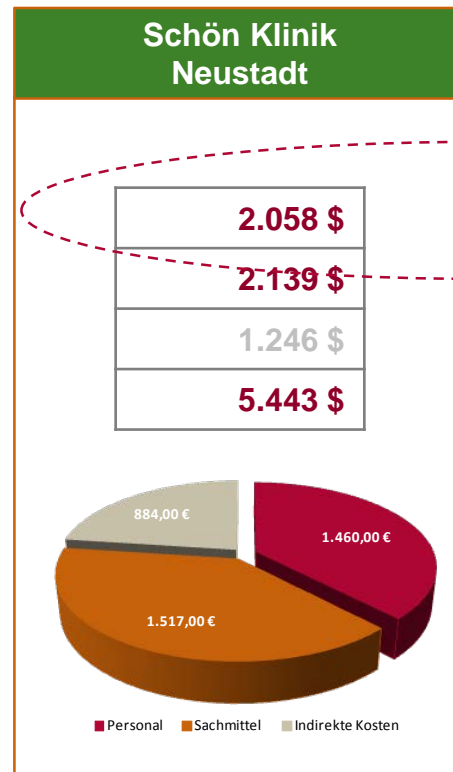


# And Schön Klinik Neustadt spends considerable less resources than Schön Klinik München Harlaching

(direct costs<sup>(1)</sup>)

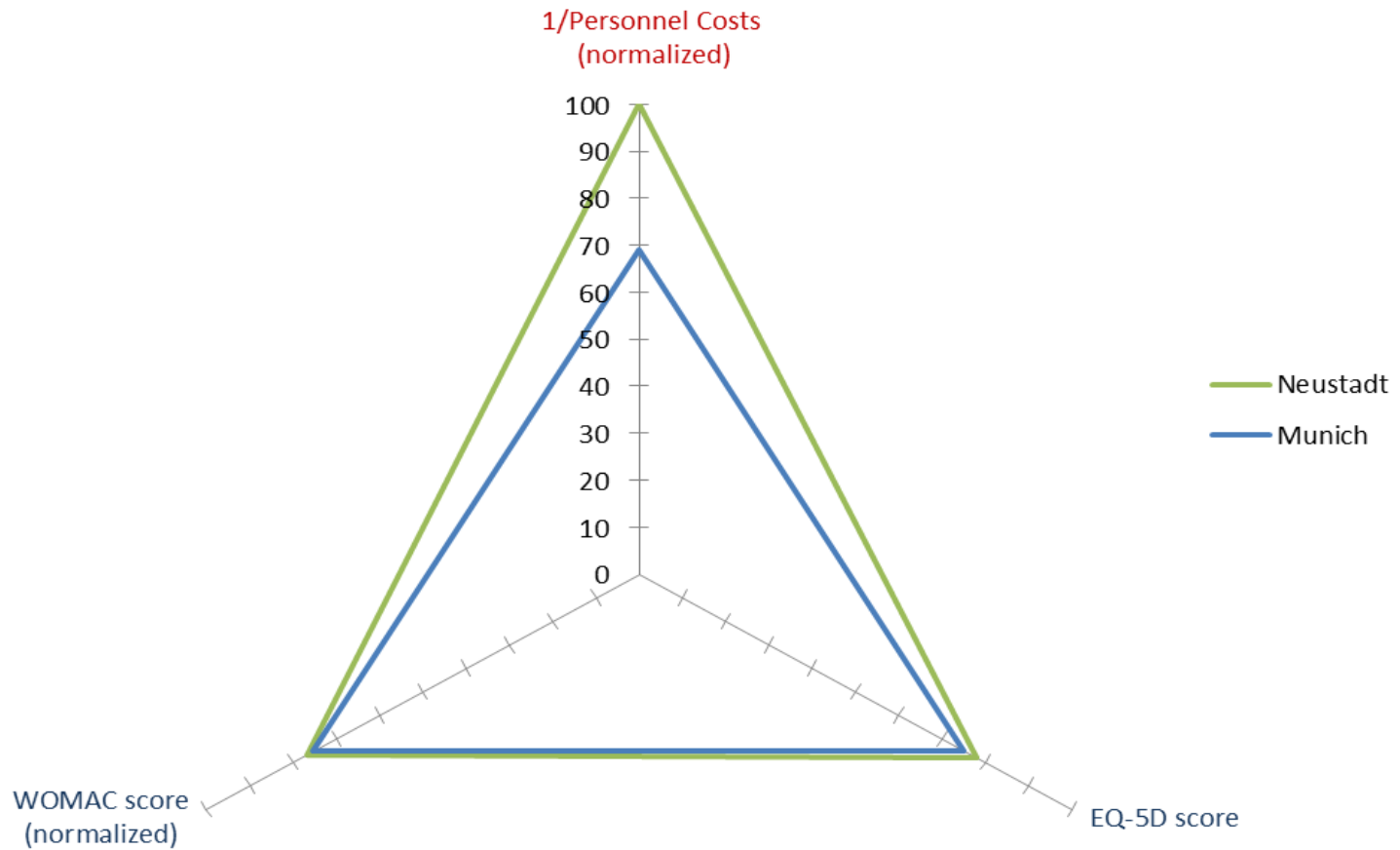
Example 3

TKR acute
Personnel costs
Material costs
Indirect costs
Sum

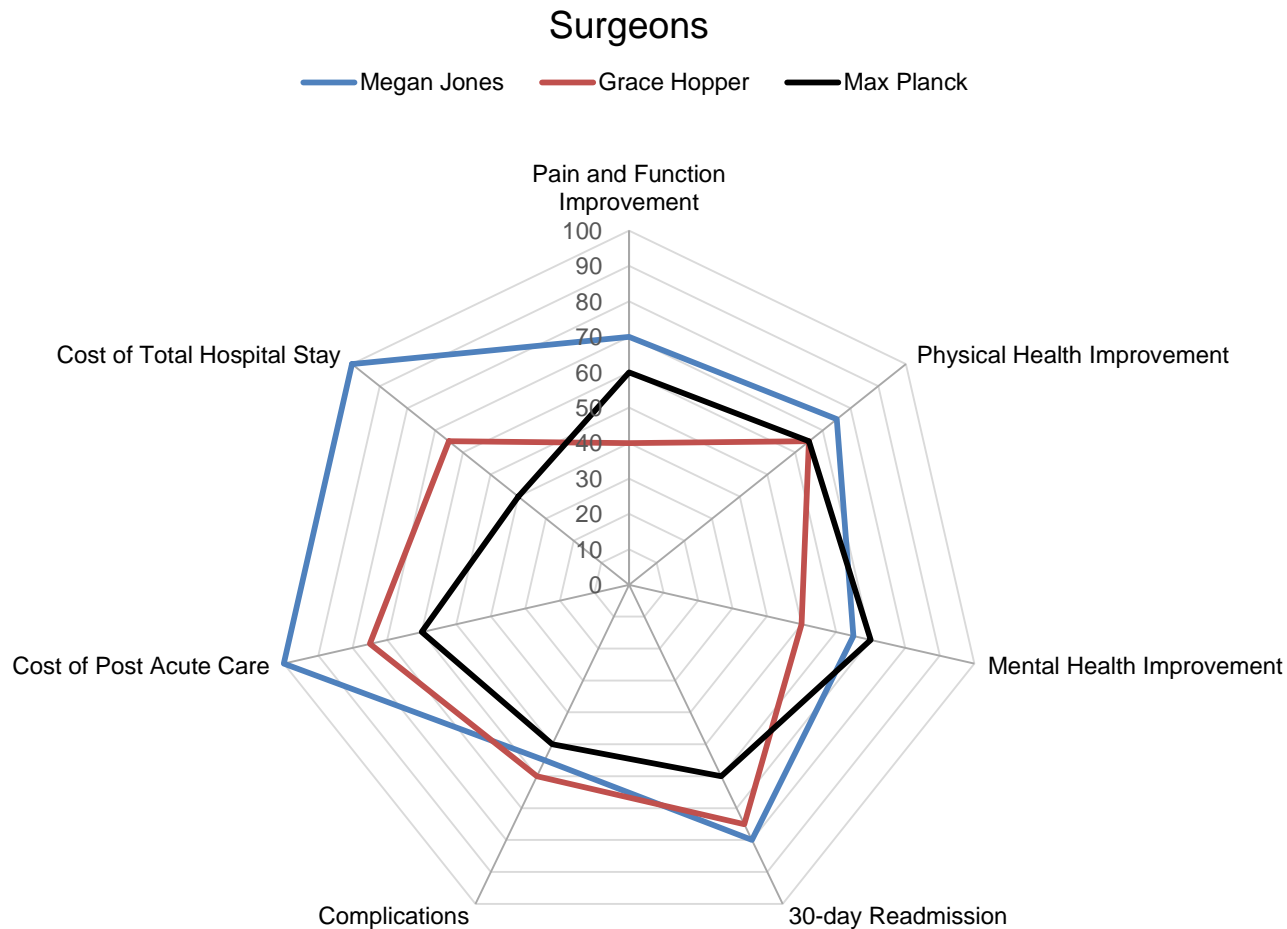


<sup>(1)</sup> numbers disguised

# Total Knee Replacements at Schön Klinik: Outcomes and Cost



# Use a Radar Chart to Comparing Total Knee Arthroplasty Outcomes and Costs Across Surgeons



Notes: A score of 100 represents ideal performance on the measure. For costs (Total Hospital Stay and Post Acute Care), a score of 100 equals the lowest cost.

Patient-reported outcomes scores (Pain and Function Improvement, Physical Health Improvement, and Mental Health Improvement) are measured using KOOS, Jr. PROMIS-10, or other outcome measurement tools.

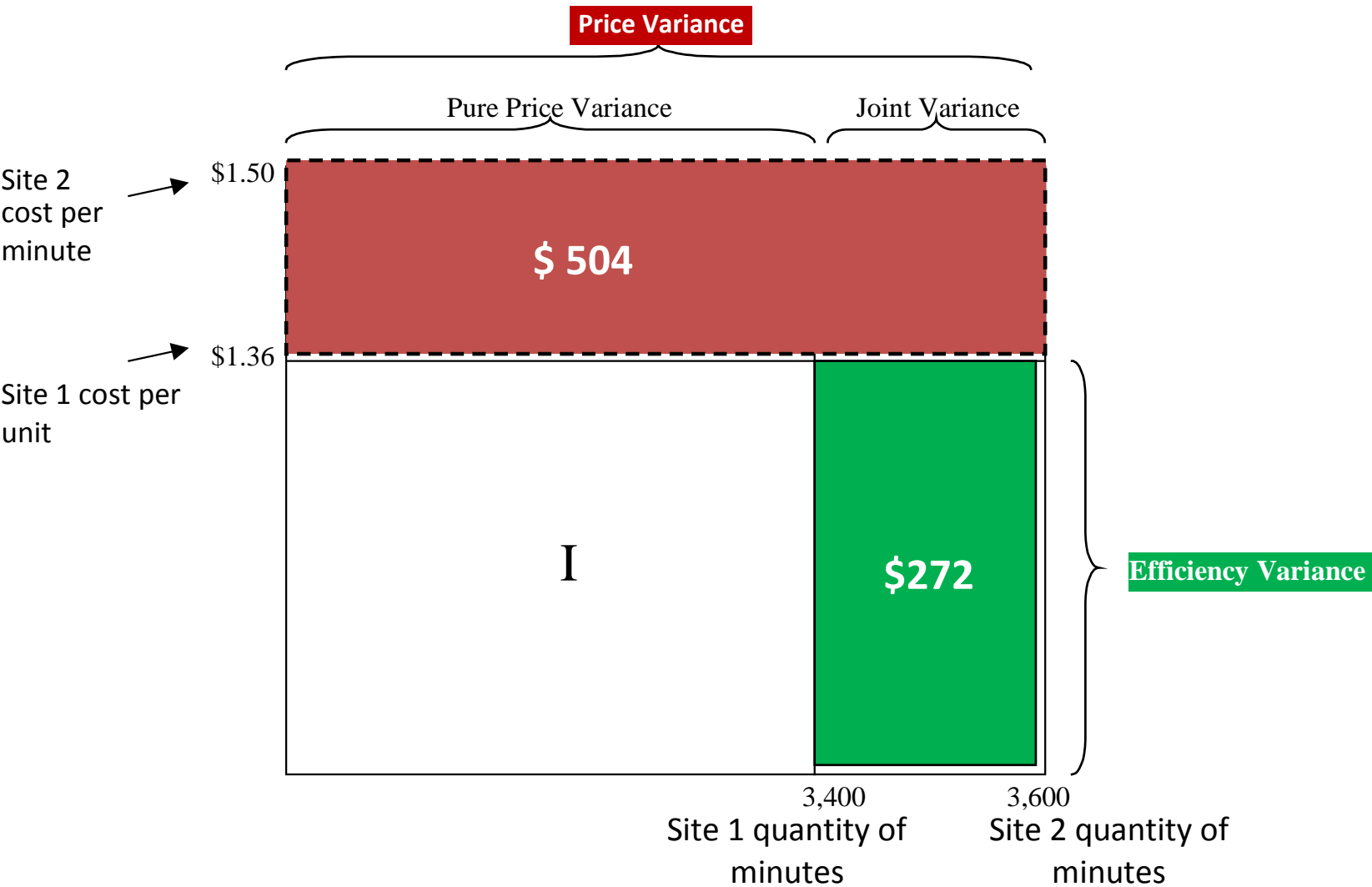
# Variance Analysis of Cost Differentials

Suppose the personnel cost at Site 2 for knee replacement was \$5,400 while at Site 1 was \$4,624

$$\text{Total Cost Variance} = \$5,400 - \$4,624 = \$ 776 \text{ (U)}$$

- Site 2 used 3,600 minutes at an average cost per minute of \$1.50
- Site 1 used 3,400 minutes at an average CPM of \$1.36
- Input price variance =  $(\$1.50 - 1.36) \times 3,600 = \$ 504 \text{ (U)}$
- Quantity (efficiency or productivity) variance  
=  $(3,600 - 3,400) \times \$1.36 = \$ 272 \text{ (U)}$

# We can view the variance analysis graphically



## Personnel Time and Cost Variances: Neustadt versus Munich

	<u>Neustadt</u>	<u>Munich</u>	<u>Variance</u>
Personnel Costs	€ 2,058	€ 2,988	€ 930. U
Personnel Minutes	1,392	2,043	€ 962.5 U
Average Cost/Minute	€ 1.48	€ 1.46	€ 32.5 F

The 45% cost difference (unfavorable cost variance of €930) is caused by the unfavorable personnel productivity variance at Munich.

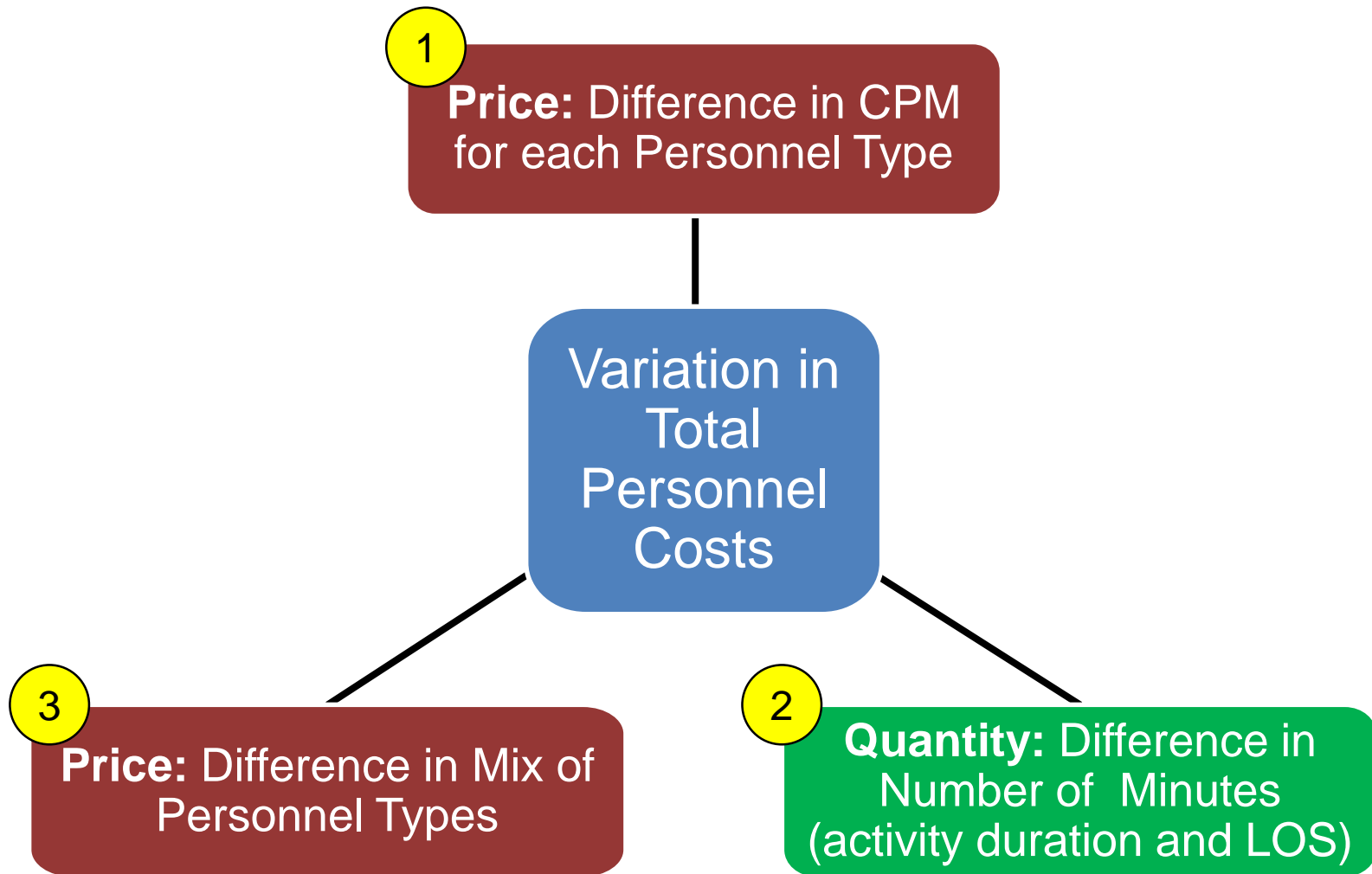
# Comparing Costs of CABG Surgeries at Narayana Health, InterMountain (IMC) and Baylor Heart (THHBP)

	THHBP	IMC	NH
<b>A. Costs using each site's own input prices and practical capacities</b>			
Personnel costs	150	87	7.4
Space costs	20	13	2.2
TOTAL	170	100	9.6
NH's cost as a % of site (NH/Site x 100; rounded)	6%	10%	
<b>B. Costs using IMC's input prices and each site's own practical capacities</b>			
Personnel costs	141	87	76
Space costs	12	13	8
TOTAL	153	100	84
NH's cost as a % of site (NH/Site x 100; rounded)	55%	84%	
<b>C. Costs using IMC's input prices and practical capacities</b>			
Personnel costs	121	87	80
Space costs	17	13	13
TOTAL	138	100	93
NH's cost as a % of site (NH/Site x 100; rounded)	67%	93%	

# Variance Analysis of Personnel Costs between NH and the two U.S. hospitals

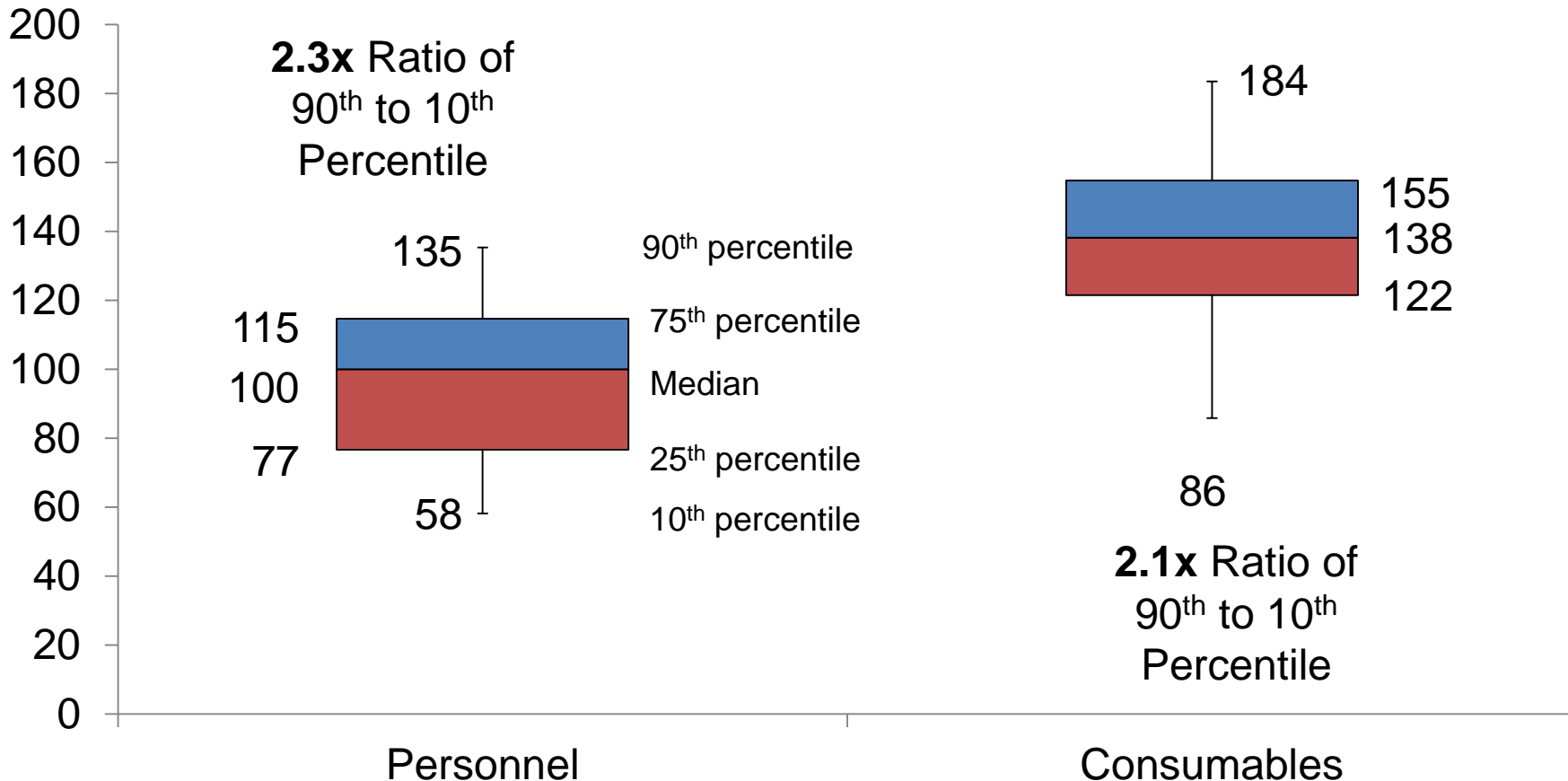
	THHBP vs. IMC	NH vs. IMC	NH vs. THHBP
Total variance	63 (100%)	-78 (100%)	-141 (100%)
Price variance	36 (57%)	-64 (82%)	-73 (52%)
Productivity variance	27 (43%)	-14 (18%)	-68 (48%)
Mix variance	13.5	-36	-84
Efficiency variance	13.5	22	16

# Benefits from Variance Analysis



# Joint Replacement Learning Community: Range in total personnel and consumable costs for Total Knee Arthroscopy (TKA)

## Indexed TKA Total Personnel and Consumable Costs at U.S. Organizations

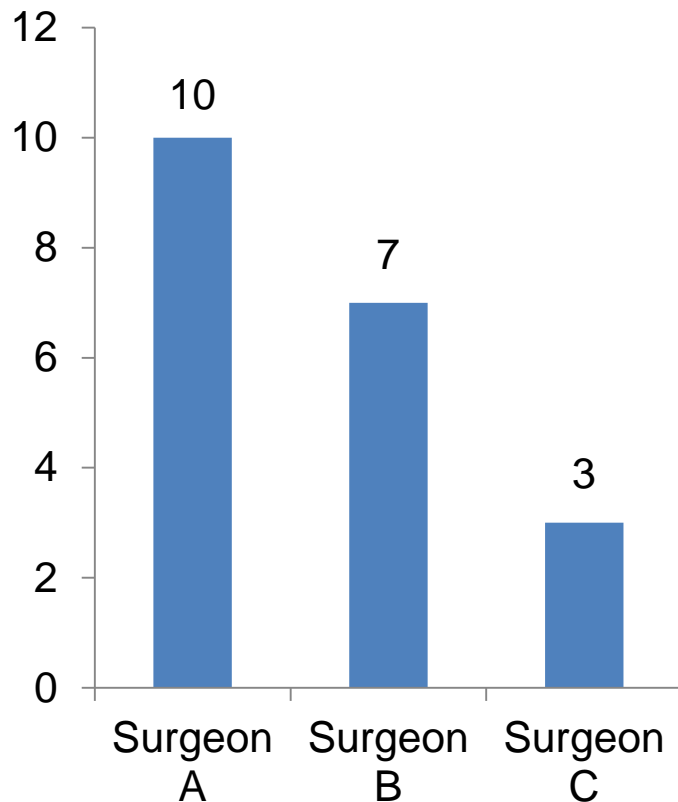


N = 27; scope of care is decision for surgery through discharge plus follow-up visits within 90 days

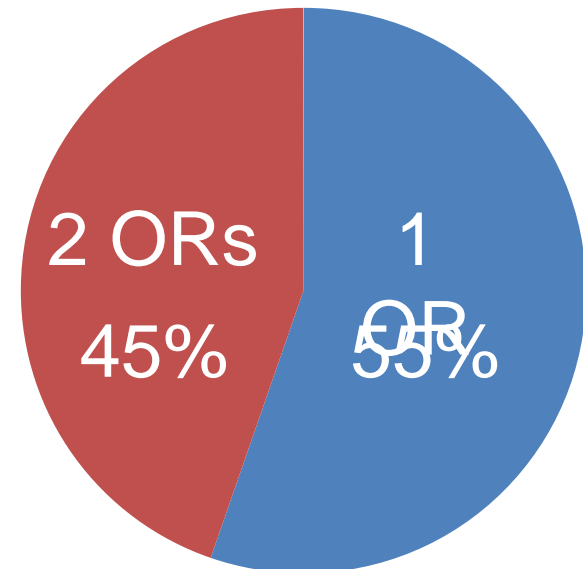
Haas, Derek A. and Robert S. Kaplan, [“Variation in the cost of care for primary total knee arthroplasties”](#) Journal of Arthroplasty (September 2016).

# Large productivity differences exist between providers

Number of Joint Replacements Performed per Day per Surgeon with Similar Cut to Close Times



Number of Operating Rooms (OR) Used per Day by Ortho Surgeons in Joint Replacement Program



# Space and equipment costs are much lower than personnel costs

## Operating Room Cost per Minute of Time

**Personnel**

**Equipment**

**Space**

**Shoulder surgery  
at Hospital A**

\$20/min

\$.25/min

\$.55/min

**Cardiac surgery  
at Hospital B**

\$20/min

\$1.30/min

\$.40/min

**Knee surgery  
at Hospital C**

\$25/min

\$.25/min

\$.35/min

# Discharge disposition, not readmissions, primary driver of variation in post acute care spend

Quartiles of Post Acute Care Spend	Home w/ Outpatient	Home Health	Inpatient Rehab	Skilled Nursing Facility	Readmissions	Standardized Cost
Highest	4%	42%	24%	29%	3%	
2nd Highest	17%	50%	4%	29%	3%	
2nd Lowest	23%	57%	7%	13%	3%	
Lowest	44%	42%	4%	10%	2%	

Organizations were categorized into quartiles based on their standardized post acute care costs; the percentages reflect the averages for each quartile of organizations

# The financial opportunity from using best practices to move to the next bracket.

## Total Personnel and Consumable Costs

	Percentage Savings	
<u>Improvement</u>	<u>TKA</u>	<u>THA</u>
90th to 75th	15%	14%
75th to 50th	8%	16%
50th to 25th	13%	13%
25th to 10th	12%	12%

Moving to next bracket produces an annual savings of > \$1 million for an organization performing 800 TJRs